

THE HUNTERIAN ORATION

ON THE

LIFE-WORK OF JOHN HUNTER, AND HIS INFLUENCE ON SURGERY.

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THE biographies of great men form conspicuous landmarks in the histories of nations like the mountains to our plains and the capes and promontories to our ocean shores. Without them the records of time would be as uninteresting in their monotony as the tedious columns of a banker's ledger, where every figure must fall with wearying regularity into one of the three spaces devoted to pounds, shillings, and pence. There would be reiterated repetition without relief, and a dull monotone would be the only sound heard in a chorus of universal platitudes. But, happily, high above the hum of the multitude, back from infinite space which time overshadows, come the voices of the great, ever calling to us to follow in their footsteps, and to search out the labyrinths of Nature by the aid of the lamp of truth. First among surgeons of immortal renown will ever remain the name of him in whose honour we have met together to-night, and after whom this Society takes its name, the illustrious John Hunter. By his beacon light the reputations of all future generations of surgeons will be tested; and whereas it may be safely predicted that the flickering light of many will disappear like the light of the stars before the rising sun, yet it may still be hoped that the world may create and this nation produce surgeons whose genius will in after years shine with as steady a light as that of the planets in the universal ether. Let us turn to the history of this great man's life, to see if we can discover in it the secret of his power, or learn how to train ourselves, in however distant a way, in the direction of this ideal. Was it by birthright, by the aid of parental wealth, that he gained a start over his fellows in the race of life? Anything but this. Was it by early mental culture, by the careful and exact training of cultivated minds in his early childhood, that he learnt the lesson of his life? No, far from this. The youngest son of a Scotch laird, his home was in the wilds of rugged Scotland, and his early education only that of a village school. Till early manhood his mind lay fallow, like his father's acres under the leaden sky of winter. True, his parents were persons of keen intelligence, if not of the highest culture, and under their roof his mind would be steadied in virtue and guarded from vice. But the records of his boyhood show no promise of pre-eminence. The time was idly spent and uneventful. We cannot even discover that he displayed any inquisitive interest in the structure of the birds or reptiles that in boyish mischief he may have captured. There is no indication of the future biologist in the boy, and nothing whatever to indicate the great scientific mind that lay in him as yet undeveloped. But, mark you, he comes of that sturdy yeoman stock that in the previous century had produced a Newton, and his two elder brothers had already shown signs of high intellectual power. These two, migrating to London, were becoming distinguished in the medical profession. The eldest dies young, but the second son, William, is destined to be the magnet that attracts the youngest towards intellectual pursuits, and through him John Hunter derived that inspiration which roused his hitherto chrysalid mind to the mighty exertions of after years. Little can we learn from such a boyhood. It is devoid of those little incidents upon which biographers delight to lay so much stress as indicating the bent of the developing mind. There is nothing corresponding to the boyhood of the great general who loved more than other boys to play with cannon, or to that of the great engineer who delighted in mechanical contrivances. All we have to contemplate is a wide uncultivated field, but the adjoining acres indicate that the soil is fertile if sown with the appropriate seed. The first venture is unsuccessful. At the age of 17, John Hunter is sent to assist a failing brother-in-law, who is a cabinet maker in Glasgow. As well might his friends have attempted to grow a succulent water-lily on the Surrey sand hills as to force such a calling upon the unwilling youth. The result is failure, and he returns again to home and idleness. Thus the first twenty years of his short life of sixty-five are, as we now judge, lost—or, at least, unproductive. Whether years that in their own time prove

unproductive are, when added to the human cycle, to be regarded as lost is an interesting problem. If so, then hours spent in healthy exercise—inasmuch as they seldom lead to immediate intellectual results—may be regarded as lost also. And sleep, even, that "foster-nurse of Nature," may be blamed for her apparently unproductive hours. But if those twenty years of mental repose led to the storing up of energies which in after years produced such magnificent results, then must they not be regarded as lost, but as potential. It is possible even that this storing up of energies by lack of opportunity had been present in the family of Hunters prior to the generation in which John was born. It is certain that the strain of blood derived from Hunter's parents was capable of supporting the highest intellectual attainments, as evidenced not only in Hunter and his brothers, but afterwards in the family of Baillies, one of whom married his sister.

John Hunter was the youngest and tenth child, but only five of the family lived to adult age. It may be interesting to those in search of the origin of genius to note that there was a great difference between the ages of Hunter's parents, and that the father was verging on his seventieth year when John was born. He lost his father when 10 years of age; to this circumstance and to his mother's indulgence is attributed the neglect of his early education. This defect followed him throughout life. His grammar is often incorrect, his sentences clumsy and obscure, and his expressions coarse, or at least inelegant. But a vigorous intellect and irrepressible will struggle through all the difficulties resulting from his defective tuition, and in this we recognise the impulsive force of true genius. To how many would such an education have proved an impassable barrier to higher intellectual attainments! Ignorant of any language but that of his birth, and but little skilled in using even this, we find him twenty years of age before his mind commences to unfold. Then comes the turning-point of his whole life, that

Tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries.

This turning-point is a letter which he addressed to his distinguished brother William, "requesting to be allowed to join him in London, and offering his services as an assistant in the dissecting-room." The reply was favourable, and contained a kind invitation to visit London. Now, mark you, this is apparently the first time that Hunter attempts to direct his own path in life. It is his own initiative. Before, he shows no liking for the parental acres. He is said to be attached to country sports but negligent of farming. His fond living parent, having neglected his education, thinks that he may earn an easy living by falling into the business of a dissipated brother-in-law. From this he returns in disgust and failure.

The tendency of parents generally is to place their sons as soon as possible into positions of ease, regardless of their inclinations; but there is this consolation, that men of genius commonly break through all restraint, and eventually determine for themselves their paths in life. It was so with the Hunters. Why parents too often fail to direct aright their children's futures it is not difficult to understand; for youth strives for distinction, age for affluence. Having arrived at a time in life when they begin to feel the burden of work and the luxury of rest, they desire to defend their sons from the toils and dangers by which alone distinction can be secured. Happily for the world, the two Hunters broke loose from parental guidance, and found in the medical profession that scope for intellectual activity to which their minds were best adapted.

Let us rest for awhile from the contemplation of John Hunter's life to study the character of that elder brother, William, who henceforth is destined to exert so powerful an influence on his career. William is ten years his senior, and was sent to Glasgow University at the age of 14 to read for the clerical profession. After five years of study his tastes lead him in another direction, so that at the age of 19 we find him at Hamilton, with a young doctor named Cullen. Three years with Cullen intensify his love for the medical profession, and he proceeds first to Edinburgh, then to London, to study, with the object of becoming Cullen's partner. At the age of 23 he is in London, residing with Dr. Douglas, a celebrated anatomist of that day, whose house he enters in the double function of anatomical assistant and preceptor to his children. Here wider fields are opened for his talents, and once more we find him asserting his own judgment. His father doubts the wisdom of this step, and writes strongly urging him to adhere

to his original intention of returning to Hamilton to be Dr. Cullen's partner, "where," he writes, "you may be very comfortably settled and make money; and if you miss this opportunity now you cannot be sure of it at another time." This parental advice, tinged as it is with Gaelic prudence, is not followed by William Hunter, who, continuing to pursue his studies in London, rapidly rises to be the most distinguished anatomist and most brilliant lecturer of his time. Later in life he directed his attention specially to midwifery, and published, nine years before his death, his great work on the gravid uterus. He collected a large museum, the materials of which cost him £100,000, and this collection, together with £8,000 for its maintenance, he bequeathed to the University of Glasgow. Adams thus describes him: "His person, though small, was graceful; his cast of features regular and interesting; his voice musical; his manners attentive and flattering. In short, Dr. Hunter was a polite scholar, an accomplished gentleman, a complete anatomist, and probably the most perfect demonstrator as well as lecturer the world had ever seen."

One sentence from a letter to his old friend Cullen, who rose to be Professor of Medicine in the University of Edinburgh, will show at once the manner and character of this truly distinguished physician. "Since I began to think for myself," he writes, "Nature, where I am best disposed to mark her, beams so strongly upon me, that I am lost in wonder, and count it sacrilege to measure her meanest features by my largest conceptions." In that one sentence we note the humility of scientific thought, associated with breadth of view and beauty of expression, which were characteristics of William Hunter. Had the whole world been searched over to find an appropriate teacher for a young developing genius, it would have been difficult to discover a more able and accomplished guide and instructor. For not only was William Hunter recognised as a scientific physician and anatomist of the greatest eminence, but he possessed in the highest degree the power of communicating knowledge. John Hunter rode from Scotland on horseback in 1748 to join his brother in London. What a new world for the uncouth Scotch lad! Picture the indifferently educated, awkward, ungainly youth, now suddenly imported into the centre of intellectual activity. How keenly must he have felt the distance between his limited knowledge and that of the circle in which his elder brother was already distinguished. At first it would seem he displayed little love for refinement, and became a leader among his brother's more noisy pupils. The higher civilisation acted slowly upon him, and came too late to remove all the angularities of thought and expression which had become deeply rooted in his northern home; but he brings a robust constitution and a determined will to carry him through his future studies, and in his brother's dissecting room he finds that new interest which supplies the requisite stimulus to excite his dormant energies into activity. His brother starts him in the usual way by giving him an upper extremity to dissect, and the pupil acquits himself so well that the master predicts for him a distinguished future in anatomy.

Thus is Hunter's mind inoculated by his brother towards the study of life through death, and henceforth the feverish thirst for knowledge, thus excited, grows more and more intense with increased acquirement. But for this one sphere of knowledge only is his mind adapted, and that the widest sphere of all; every creature or thing that may be accounted to have life will, in future years, when brought within his ken, command his earnest attention and study. As yet he treads but the lowest steps in the study of life, but his interest is awakened, and he is, thus encouraged to labour on without sense of weariness.

The following summer, again through his brother's influence, he is enabled to study surgery at the Chelsea Hospital under Cheselden, the famous lithotomist, and he returns to assist his brother when the autumn session of anatomy commences. After Cheselden's retirement he studies under Percival Pott, and thus five years are spent between anatomy and surgery. Then, in 1753, a new departure is made, and we find John Hunter entered as a gentleman commoner at St. Mary's Hall, Oxford. This change is attributed to the desire of his brother William to see him better trained in classic lore, but the experiment is a failure. Hunter's mind is one strong in its own lines, but showing little adaptability to the teaching of others, and at the age of 25, after five years spent in anatomy and surgery, he cannot be persuaded as he says "to stuff Latin and Greek at the university," so he returns again to London to enter as a pupil at St. George's Hospital, where, in 1756, he is appointed house surgeon. In the same year he joins his brother as a partner and joint lecturer in his

anatomical school, and this must therefore be regarded as the termination of his student's career. He is now 23 years of age, well trained in surgery, and an able and laborious anatomist; but as a lecturer we find him, when brought into contrast with his brother, a comparative failure. This is due in no way to a lack of knowledge, but to the difficulty he experienced in expressing his thoughts in words ready for immediate service. Perhaps it may be regarded in some degree as fortunate that he was not possessed of natural eloquence, inasmuch as a popular teacher is apt to be diverted by his popularity from those close studies and laborious investigations with which Hunter's name is henceforth to be associated.

Thus he labours on with scalpel and forceps in the dissecting-room, and now begins to widen his views by original researches in conjunction with his brother William, or independently of him. He works at the descent of the testis, and employs himself in a series of observations on the anatomy and uses of the lymphatics. But this close and continuous anatomical work begins to tell on his health, and in the spring of 1759 he is seized with inflammation of the lungs. The effects are slow in clearing, and as his elder brother James died of consumption, he is strongly advised to leave London, and seek change in a warmer climate. With this object he applies for an appointment in the army, and is soon on his way as staff-surgeon with the expedition sent in 1761 to lay siege to Belleisle. The army has proved destructive of many an early reputation, and there might have been a danger to Hunter of a renewal of those dissipations to which he appeared to have some inclination when he first came to London. But the love of science has taken too strong a hold upon him to allow him to break away from her influence. Although engaged in practical surgical duties and the study of gunshot wounds, we find him employing his leisure hours in observations on the hearing of fishes and the digestion of hibernating animals during the torpid state. The following year he is sent with an expedition to support the Portuguese against the Spaniards, and peace being proclaimed in the spring of 1763 he returns once more to London.

John Hunter's second entry into the metropolis at the age of 35 may be contrasted with that he made fifteen years before under his brother's guidance. Then he was ignorant, uncultured, and without prospect in life. Now, thanks largely to that brother's influence and training, he is recognised as an accomplished anatomist and able surgeon. He still displays some roughness of manner, some ungoverned impulses of temper, and perhaps a little tendency to quarrel with other workers in the same field, but he is thoroughly imbued with a love of scientific inquiry, and has shown an industry, perseverance, and originality of thought which in future years will raise him to the highest pinnacle of surgical fame.

The position he held as demonstrator in his brother's dissecting room has been worthily filled by a Mr. Hewson in his absence, and the independence of thought which was one of John Hunter's characteristics may have rendered a reunion with his brother inadvisable even if again possible. He is still poor, but possessed of resources which may command wealth, and he has his half-pay from the army to contribute to his support. He starts in practice in Golden Square, but the public are slow to discover his talents, and thus he is left with plenty of time in which to pursue his biological studies. In order to increase his income he gives a course of lectures on anatomy and surgery, but these are not largely attended. Thus his two chief defects, roughness of manner and lack of fluency in speech, debar him at the commencement both from public and professional favour.

About this time he purchased a piece of ground at Earl's Court, then two miles from London, and built there a small house, which he converted into a kind of menagerie for the study of animals and for the carrying out of experiments. There bulls and leopards, eagles, dogs, pigs, poultry, bees—indeed, almost every living creature he could collect around him—were subjected to his critical examination and study. This house came under the auctioneer's hammer on February 16th, 1886, only two years ago, and it may be interesting to hear a last description of it, which I take from the BRITISH MEDICAL JOURNAL of February 20th: "Behind a large brown brick house stood a fine lawn, at the right extremity of which was a grassy mound, in form like a small brick kiln. This mound was surmounted by a low machicolated brickwork turret, for which various explanations have been advanced. Indeed, this tower has been made the basis of Hunterian legends; but it was most probably erected before Hunter's time, and meant for ornament, after ideas due to influences derived from Versailles and Holland. Three dens were excavated in the mound, the

central den being fairly capacious; but, according to modern ideas, they were ill-adapted for the reception of live carnivora. The story of the escape of two leopards from the den is probably well known. Close to the dens grew some fine trees, including a fine mulberry, in the bark of which the late Mr. Frank Buckland believed that he could trace old incisions, made by Hunter, for the introduction of a thermometer in his experiments on the physiology of the circulation of the sap. At the left hand corner of the grounds, beyond the lawn, was a small workshop, with a loft, evidently as old or older than Hunter, but what use he made of it remains unknown. Turning back to the house, a long, low, subterranean passage led from the grounds under the building to the yard in the front part of the premises. It was hardly six feet in height, and midway it led to two small chambers well bricked, the one was used for the famous madder-refuse experiments on swine, the opposite chamber contained two copper furnaces. It was in the larger copper, concealed in this little apartment, that the skeleton of the Irish giant, Byrne O'Brian, and many other specimens, were prepared. Doubtful as may be the original meaning of the passage under the house, it cannot be doubted that Hunter found it very useful for the introduction of 'subjects' and the prosecution of work away from the dangers of popular prejudices and inquisitiveness."

But to return to Hunter's life. Although as yet he has found little favour with the public, in the scientific world his eminent abilities now command respect, and it is to the credit of the Royal Society that he was elected a Fellow in 1767, at a time when he was poor and little known apart from anatomical work. The following year, again through his brother's influence, he is elected surgeon to St. George's Hospital. One last benefit he obtains from that elder brother, when Dr. Hunter gives up to him his house in Jermyn Street, after moving his museum and school to a more spacious house in Great Windmill Street. This change was made in 1770. Thus we find John Hunter, at the age of 42, acquiring that success in life which he so well deserved, living in a large house in a situation favourable for practice, surgeon to a hospital, and a Fellow of the Royal Society. His income is further increased by taking resident pupils (of whom the afterwards celebrated Edward Jenner is the first), and in 1771 he marries Miss Home, to whom he had been engaged for some years.

From the time he left the army till this year, when he published a treatise on the teeth, there has survived no paper from his pen; but he doubtless was, by his laborious dissections, laying the foundations of many of his future researches into the study of life.

When 40 years of age he began to suffer from gout; and at the age of 45 he had his first attack of angina pectoris, during which his pulse could not be felt at the wrist, and his respiration was, according to his own account, only carried on by voluntary effort. This was the first indication of ossified coronary arteries, to which he succumbed twenty years later during a fit of excitement.

John Hunter's first paper before the Royal Society was communicated five years after election, on the suggestion of the President, Sir John Pringle. It was on *Post-mortem Digestion of the Stomach*, a subject that brought him into court some nine years later as an expert in the trial of Captain Donellan for the murder of Sir Theodosius Broughton. To the legal mind, which requires a positive affirmation or denial of every question, Hunter's evidence appeared worse than useless. He could not be induced to give any opinion that his knowledge of facts would not warrant, and this caution (which is characteristic of a philosophical mind) brought down upon him some severe and sarcastic remarks from Mr. Justice Buller, who presided at the trial. It would be impossible for me to notice the many different contributions to biology, physiology, and pathology from Hunter's pen; but this may be said of all, that they invariably indicate a mind trained to exact observation, ever on the search for truth; and, where possible, observation is always supplemented by experiment. Over what a wide field he travelled will be sufficiently indicated by naming a few of them: *Observations on Animals and Vegetables with respect to the Power of Producing Heat; An Account of Certain Receptacles for Air in Birds; Proposals for the Recovery of People apparently drowned; Observations tending to show the Wolf, Jackal, and Dog are all of the same Species; Some Observations on Loose Cartilages found in Joints; Observations on the Structure and Economy of Whales; Observations on Bees; Observations on Fossil Bones*. These and many other scientific papers were written whilst he was a surgeon and lecturer at a hospital and occupied more or less with private practice.

As a lecturer he appears never to have been a great success, not simply on account of his difficulty in finding words to express his views, but because he dared never make any statement beyond what his facts would warrant, and consequently never spoke with dogmatic emphasis. The difficulty appears to have been felt as much by the teacher as by the students, for one biographer states that "the task was so formidable to him that he was obliged to take thirty drops of laudanum before he entered the theatre at the beginning of each course," and, as a result, I imagine the lecturer and class must have gone to sleep together.

His friend and pupil, Edward Jenner, had now settled at Berkeley in Gloucestershire, and Hunter enters into a correspondence with him, which is full of the ideas which are occupying his mind. He thus stimulates his friend to exert himself in original inquiry, and asks his assistance in obtaining specimens for himself. The following is a typical sentence from one of these letters: "I want you to pursue the experiments on the heat of the hedgehog this winter; and if you could send me a colony of them I should be glad, as I expended all I had except two—one an eagle ate, and a ferret caught the other."

Hunter's fame as a surgeon is now rapidly on the increase. In 1776 he is appointed Surgeon Extraordinary to the King, and his pathological labours begin to excite a mixture of admiration and envy. He commenced to erect his museum in Leicester Square in 1783, as the house he lived in would no longer hold his numerous specimens, and the new premises were completed in 1785, the year which is rendered noteworthy in the annals of surgery by the first performance of his operation for aneurysm.

In the spring of this year he is seized with a very severe illness, accompanied by cerebral symptoms and a number of curious secondary sensations, from which he imperfectly recovered. After this date any exercise or mental emotion was apt to bring on acute spasmodic agony, but his work was by no means finished, and he laboured on.

In 1786 he was appointed Deputy Surgeon-General to the Army, and he soon after published his work on the *Lues Venerea*. This work shows much philosophical reasoning, but he falls into two serious errors: one that two diseases cannot exist in the body at the same time, and the other (well known as the result of sacrificing his own bodily health to experimental inoculation) that gonorrhoea, chancre, and soft sore were all the result of one poison. In spite of these errors, his description of the hard, or, as it is still called, the Hunterian chancre, is as true now as then, and with its signs well developed secondary symptoms invariably follow. I will quote from this work to show how wide was Hunter's reasoning: "Nature," he says, "has not been able to apply any one part to two uses with advantage, as might be illustrated in many instances in different animals. The animals whose legs are contrived both for swimming and walking are not good at either, as seals, otters, ducks, and geese. The animals, also, whose legs are intended both for walking and flying, are but badly formed for either, as the bat. The same observations are applicable to fish, for the flying fish neither swims nor flies well, and whenever parts intended for such double functions are diseased, both are performed imperfectly. This is immediately applicable to the urethra, for it is intended as a canal or passage, both for the urine and the semen. The urine requires the simplest of all canals, and of no greater length than the distance from the bladder to the external surface, as we find the urethra in women, birds, the amphibia, and fish; but the passage for the semen in the quadruped requires to be a complicated canal, and of a length capable of conveying the semen to the female, provided with many additional and necessary parts, as the corpus spongiosum urethrae, muscoli acceleratores, Cowper's glands, prostatic gland, and vesiculæ seminales. As all these parts are to serve the purpose of generation, and as the diseases of the canal are principally seated in them, we at once see how much the urinary organs must suffer from a connection with parts so numerous and so liable to disease; and what adds to the evil is that the actions of the urinary organs are constant and absolutely necessary for the well-being of the machine, whereas the evacuation of the semen takes place only during a certain portion of life, is then only occasional, and never essentially necessary to the existence of the individual."

In another place we find him, with philosophical fairness, framing an apology for the exaggerated praise with which Daran introduced the use of the bougie: "Such extravagant recommendations of particular remedies," he says, "are not at all times without their use. Inoculation would still have been practised with caution, had it not been for the enthusiasm of the Suttons. Pre-

parations of lead would not have been so universally applied, if they had not been recommended by Goulard in the most extravagant terms; nor would the hemlock have come into such general use, if its true merits only had been held forth. Improvements are often over-rated; but they come to their true value at last. Sutton has told us that the cold regimen in extreme is infinitely better than the old method; but from general practice we have learned that moderation is best, which is all we yet know. When Paron published his observations on the bougie, every surgeon set to work to discover the composition, and each conceived that he had found it out, from the bougies he had made producing the effect described by Paron. It never occurred to them that any extraneous body of the same shape and consistence would do the same thing."

In spite of the errors to which I have alluded, this work did much good service, for it was an honest endeavour to free an uninviting branch of surgery from the monstrous quackery with which it was then associated, and from which, even in our day, it cannot be considered to be absolutely disentangled. The same year that he published this work, he received the Copley Medal of the Royal Society, and he opened his museum in Leicester Square. In 1789, he is appointed Surgeon-General and Inspector of the Army, and he has a rather severe illness, accompanied with cerebral symptoms. The attacks of angina now become frequent; yet, in the year before he died, we find him printing his great work on the blood and inflammation; and he is at work framing a catalogue for his museum. So well did he know his dangers, that he used frequently to say "his life was in the hands of any scoundrel who chose to put him in a passion." The sudden death he had so truly predicted actually took place in St. George's Hospital, in 1793, when he retired from a meeting at which he had been opposed to die in an adjoining room.

Such was the life of Hunter, a life of infinite labour. Yet, what surprises us most is the immense amount accomplished in so limited a space of time. For the first twenty years cannot be counted as part of his mental life. This was a period of mental quiescence. Then followed ten years of arduous preparation, resulting in illness, and the rest of his days he works on with heroic fortitude, under conditions of health that would have determined any other man to have relinquished all ideas of fame and fortune, and to have retired to a life of rest and obscurity. During the last twenty years of his life he was subject to attacks of agonising angina, and no one knew better than he what dangers to life these symptoms foreshadowed. Yet, with a perfect knowledge that any sudden emotion might result in immediate dissolution, he labours on to the very end. Truly this was a courageous life, ending, like the soldier's on the battle-field, in heroic death. He might well have said, with Cæsar:

Cowards die many times before their deaths;
The valiant never taste of death but once.
Of all the wonders that I yet have heard,
It seems to me more strange that men should fear,
Seeing that death, a necessary end,
Will come when it will come.

Let us endeavour now to trace some of the distinguishing faculties of this master mind. In many qualities John Hunter resembled his elder brother, whilst in most he surpassed him. In both there was the same insatiable love of collecting, which was not confined to objects of professional or even biological interest, but extended to coins, pictures, armour, or indeed anything out of the common. In both there was the same industry, perseverance, and love of original research. In both we trace the same self-will and integrity, combined with a jealous determination to defend any encroachment upon supposed or actual rights. This jealous care over the fruits of their labours ends eventually in an estrangement between the two brothers, which is only healed when the elder is on the point of death. Much as it was to be regretted, it probably arose from the natural antagonism of the same qualities in each, rather than from any actual rivalry. Lastly, we find that the study of life and of death, with a view of benefiting their fellows, was the one overruling passion in the mind of each.

It may be an interesting speculation how much of John Hunter's genius was transmitted to him by his parents, and how much was due to the influence of his elder brother. I think we must recognise both these factors as contributing to his success. The close resemblance we have traced in many of the mental attributes of the two brothers indicates their origin from a common stock, as clearly, perhaps, as any resemblance in their features. It was the elder brother, William, who first discovered for himself

that the study of life was the direction in which his mind felt the greatest pleasure, and he had advanced far along the road of science before John attempts to follow him. But when once John is brought under his influence, he suddenly develops a thirst for knowledge which is in extraordinary contrast to his former indifference. It can only be compared with the inoculation of virgin tissue with some virulent poison, or, what we now begin to regard as a similar process, the fermentation of some minute fungus in its appropriate nidus. His love for scientific research grows into a raging lust, which governs his whole future, and causes him to sacrifice both wealth and health in its pursuit.

All here will easily bring to mind a parallel between two brothers now living and the two Hunters. I need not mention names, to remind you of an elder brother, distinguished in medicine, who has been more than equalled by a younger brother who has devoted his life to the science and art of surgery.

John Hunter married about the middle period of life, and had four children, two of whom grew to adult age, but neither of these left issue. Although Galton has attempted to trace hereditary genius, his observations would tend to show that it is more likely to make its reappearance in side-heirs than in the immediate offspring of great men. I have often thought it, a pity we cannot slip geniuses as they do rare plants and shrubs. The children of highly intellectual parents are too often the outcome of mental and physical exhaustion, and the race becomes weak, erratic, or extinct. Doubtless great cities, which are the hotbeds of intellect as well as of vice, are largely responsible for this degeneration. As Emerson puts it: "The city would have died out, rotted and exploded, long ago, but that it was reinforced from the fields. It is only country which came to town the day before yesterday that is city and court to-day." The proper children of great intellects are the intellects of their pupils rather than those of their flesh-begotten offspring. Traced in this way Hunter left many children, and his race has spread far and wide. It must never be forgotten that Edward Jenner was his most intimate friend and pupil, and the Hunterian mode of thought developed in Jenner led to the immortal discovery of vaccination. What inestimable benefits have accrued from this discovery by a child of Hunter may be gauged by the foolish opposition that immunity from small-pox has enabled agitators to develop against the Vaccination Act. I would the antivaccinators would take to heart *Punch's* parody on Hamlet:

To vaccinate or not?—that is the question;
Whether 'tis better for a man to suffer
The painful pangs and lasting marks of small-pox,
Or to bare arms before the surgeon's lancet,
And, by being vaccinated, end them? Yes,
To feel the tiny point, and say we end
The chance of many a thousand awful scars
That flesh is heir to, 'tis a consummation
Devoutly to be wished. Ah! soft you now—
The vaccinator! Sir, upon your rounds,
Be my poor arms remembered.

But not Jenner only, but Home, Cline, Astley Cooper, Abernethy, Travers, and Blizard were Hunter's intellectual descendants by direct contact, and they have handed on his teachings to those known in our own day.

What was there in Hunter's mind that made such great men his apostles, and led all subsequent generations of surgeons to regard him as a guiding star in surgery? If we inquire what improvement, that might be regarded as an invention, he added to the art of surgery? the answer comes at once: the Hunterian operation for aneurysm. Nearly every great surgeon devises one new operation, to which his name is apt to become attached; but if his reputation depended on this alone, how little would be his worth.

Hunter was the first to perform the operation for the cure of aneurysm by ligaturing the artery, on the proximal side, at a distance from the sac. Astley Cooper's name is associated with a bold attempt to ligature the aorta, but his reputation rests mainly on his philosophical work *On Fractures and Dislocations*. Lister's name is associated with a not very successful method of excising the wrist-joint, but his fame will be handed down by his scientific investigations for the protection of wounds from external influence, which resulted in the "antiseptic system." Even I, who do not deserve to be mentioned in the same hemisphere with such men, have performed one operation of which a small mind might be proud. I allude to a case of total suppression of urine lasting five days, which I relieved when the patient was *in extremis* by cutting down on the one remaining kidney, and removing a stone, which was plugging its outlet. This patient, two years and a half

after the operation, remains in perfect health. But such advances in operative surgery, though of importance to the world as tending to preserve life, will never alone serve to support a great reputation. Hunter was far more than a mere operation-inventor; though this, when it can be shown, to have been deduced from previous observations, is not a thing altogether to be despised. He was far greater than this. He was above all the greatest surgical philosopher that every lived. He was constantly searching for new facts, and adding to his museum preparations which acted as a kind of index to those facts; and from these facts, when accumulated in sufficient numbers, he deduced general laws. Thus he worked a revolution in surgical pathology, and he raised the science of surgery, from the doubtful position that it occupied before his time to a level with the sister science of medicine. Over what a desert the river of his thoughts has since flowed! How many diseases and deformities, then thought to be incurable, have since been brought within the range of surgical relief! The old lumber room filled with incurable diseases and misunderstood pathology, that was left to the care of medicine, has since been ransacked over and found to contain much that surgery could relieve or cure. Within our own time the kidney has become a surgical organ, the gall-bladder has had to yield up its obnoxious stones to the captivating influence of the surgeon's knife, the stomach and intestines, the lung, and even the brain itself, have in turn been brought within the range of surgery.

To aid us in our labours, two great discoveries have been made since Hunter's time; the introduction of chloroform, which makes operations painless, and the use of antiseptics, which renders them safe. But in spite of all the great advances made since his time, Hunter's name and Hunter's fame shine through them all. So far from detracting from the merits of his labours, they simply add lustre to his achievements. But we must not be deterred by the contemplation of his greatness from exerting such talents as we may possess in the humble sphere that we may occupy. Though it is allowed to few like Hunter to touch immortality on this side of eternity, yet let us take courage in the thought that there is nothing in Nature, however minute or obscure, that has not some power over its immediate surroundings. With this thought let me close my address in the words of a philosopher I have already quoted: "All things are engaged in writing their history. The planet, the pebble, goes attended by its shadow. The rolling rock leaves its scratches on the mountain, the river its channel in the soil, the animal its bones in the stratum, the fern and leaf their modest epitaph in the coal. The falling drop makes its sculpture in the sand or stone. Not a foot steps into the snow, or along the ground, but prints in characters more or less lasting a map of its march. Every act of the man inscribes itself in the memory of his fellows, and in his own manners and face. The air is full of sounds, the sky of tokens, the ground is all memoranda and signatures, and every object covered over with hints which speak to the intelligent."

CLINICAL LECTURES

DISEASES OF THE NERVOUS SYSTEM.

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LECTURE IX.—SENSORY APHASIA.

THE manifold forms of aphasia have been variously classified by different authorities. The comparative claims of the diverse divisions of the subject it is at present unnecessary to discuss. It will be convenient in this lecture to regard the disorder simply from a dual aspect—namely, from the influence the sensory or motor elements of the nervous system have in its production. Intellectual language, taken in its broad sense, is the medium through which individuals intercommunicate. This may be effected in a variety of ways, but is chiefly carried on by means of speech, writing, and gesture. For the successful performance of these, a double attribute must exist: first, we have to appreciate and understand the indications given by our neighbours; and, secondly, we have in turn to convey our thoughts and purposes to them. As a knowledge of the former is derived through our senses, the collective phenomena involved in its production

may be called the ingoing, impressive, centripetal, or, in simpler terms, the sensory function of intellectual language. On the other hand, the latter, which, as a rule, is accompanied by the performance of a muscular act, may be named the outgoing, expressive, centrifugal, or the motor function of speech. Each of these sensory and motor functions is represented by a corresponding special nervous mechanism, which may become diseased and give rise to a characteristic disorder of speech, and which may, for convenience, be termed respectively sensory or motor aphasia. That form of aphasia which results from interrupted functional activity of the motor nervous elements includes disorder, not only of speech, but of writing and gesture; in short, of all those means by which an individual attempts to convey his wishes or thoughts to another. Each of these modes of expression is presided over by a complex system consisting of muscles, nerves, and centres in the cord, medulla, and cortex, which may be independently deranged, or lost, and, in consequence, aphonia, agraphia, or amimia, is induced. These varieties of so-called aphasia are of tolerably frequent occurrence; they are, as a rule, capable of easy recognition, and so many instances have been recorded in medical literature that their existence has been amply established.

The condition of what has been termed sensory aphasia is much more complex, and uncomplicated examples are of much less frequent occurrence. It is through the senses, and especially through those of hearing and sight, that the faculty of intellectual language is acquired, and by which it is organised in the individual. The association of the senses with the acquisition of speech is effected by certain nervous elements, including the organs of sense, various conducting media, and centres in the medulla and cortex cerebri. By sensory aphasia, therefore, is understood the results of interruption or disease of any of these centripetal paths or centres which induce an imperfect appreciation of language or its symbols, and which, as a consequence, may indirectly lead to disorder of the faculty of expression. In addition to the sensory organs themselves, and the complex nervous arrangements which connect them with the surface of the brain, there must be other and more extensive cerebral structures engaged in the acquisition or formation of speech. These supply what has been termed the apprehensive faculties, or the mental attributes involved in the process of human intercourse, or communication, the exact nature and locality of which is not accurately determined. Therefore, on the sensory side aphasia may arise either from disease of the centres associated with the senses themselves, and especially those of hearing and sight; or with a derangement of the nerve elements, whatever, and wherever, they may be, which preside over the so-called apprehensive faculty. This results in what has been termed respectively word deafness, word blindness, and word forgetfulness, or verbal amnesia, each being due to disorder of the special nervous mechanism which originates and regulates the corresponding function. Uncomplicated examples of these forms of sensory aphasia are rare; accordingly, I now demonstrate an illustrative case of each.

1. *Case of Word Blindness.*—G. L., aged 52, a shipwright. This patient complains of blindness to the right side of both eyes, and although on the left he can see fairly well, of inability to read or understand written or printed words. He states that his family history was unimportant, that he never had suffered from syphilis, and that he had always been a temperate man. For some years before he came under observation he had complained of indefinite pains in his lower extremities, accompanied with general malaise, neither of which, however, had incapacitated him from work. With these exceptions he was in all respects a healthy man till some twenty months before examination, when one day he suddenly fell down, unconscious, and remained so for about an hour. He did not know whether or not he was convulsed. Soon after this attack he regained his former condition and returned to work, but he fancied that his right side was weaker than before, and that his eyesight was not so good as formerly. He, however, continued at his ordinary occupation till five months before coming under observation, when he gradually became incapacitated from giddiness and slowly increasing inability to read.

On examination he is found to be a robust and healthy-looking man. The organs and functions are normal, except those about to be mentioned. There is nowhere any sign of paralysis or tremor, but there is a suspicion that the power of the right side is slightly impaired; but if this is so it is scarcely noticeable. Both knee-jerks are somewhat exaggerated, especially on the right side, and here also there is imperfect ankle clonus. Sensibility is everywhere normal. The vessels throughout are somewhat hard and